

**Korea-Myanmar Industrial Complex Development Co., Ltd.**



**SELECTION OF CONSULTANTS – Terms of Reference**

**TOR: KMIC-PDD 05**  
**Selection of Consulting Services for:**

**MASTER PLAN AND BIDDING GUIDE FOR WASTEWATER  
TREATMENT PLANT OF  
KOREA-MYANMAR INDUSTRIAL COMPLEX DEVELOPMENT  
PROJECT**

**Client: KMIC Development Co., Ltd.**

**Country: Republic of the Union of Myanmar**

**Project: Korea-Myanmar Industrial Complex Development Project**

**Issued on: October 2020**

## **PART III**

### **Section 9. Terms of Reference**

**Reference Number (KMIC-PDD 05)**

**Consulting Services for: Master Plan and Bidding Guide For Wastewater Treatment Plant of Korea-Myanmar Industrial Complex Development Project**

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# Terms of Reference

Consulting Services for Master Plan and  
Bidding Guide For Wastewater Treatment  
Plant of Korea-Myanmar Industrial Complex  
Development Project

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## **Table of Contents**

**I. SUMMARY OF THE SERVICES**

**II. GENERAL TERMS AND CONDITIONS**

**III. SCOPE OF THE ASSIGNMENT, TASKS, EXPECTED DELIVERABLES**

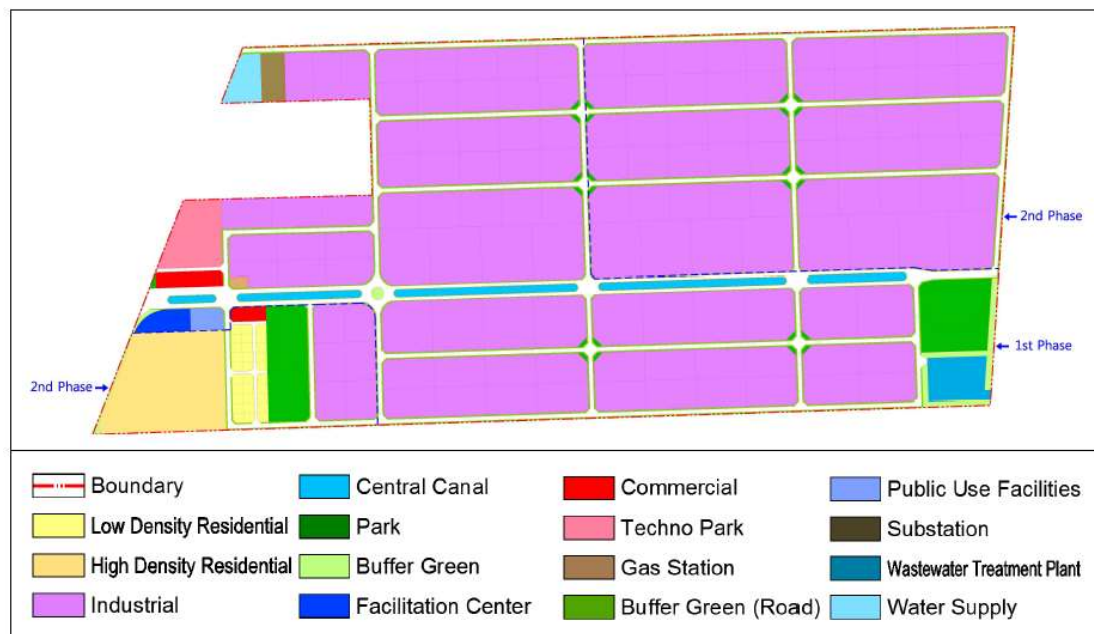
## I. SUMMARY OF THE SERVICES

1. **Name:** Consulting Services for Master Plan and Bidding Guide for Wastewater Treatment Plant of Korea-Myanmar Industrial Complex Development Project
2. **Location of KMIC :** Nyaung Hnint Pin, Hlegu Township, Yangon Region, Myanmar
3. **Facility capacity :** About 5,100 m<sup>3</sup>/day (Needed total facility capacity of KMIC)

※ The area of Wastewater treatment Plant : 19,474 m<sup>2</sup>

※ The Project area is divided into 2 phases, and the wastewater treatment plant will be installed 2<sup>nd</sup> step or more in consideration of the initial factory operation.

- 1<sup>st</sup> phase (Zone A): 314.69 acres (1,273,514 m<sup>2</sup>)
- 2<sup>nd</sup> phase (Zone B): 241.12 acres (975,774 m<sup>2</sup>)



### 4. Purpose of the Services

- 1) The overall objective of this Consultancy is to establish a master plan and prepare bidding guide for the construction of wastewater treatment plant located in KMIC
- 2) This Consultancy is aimed at timely implementation of the relevant permits through a thorough review of relevant contents in accordance with the relevant laws and regulations in the implementation of wastewater treatment plant construction and faithful creation of deliverables.

### 5. Work Scope

- 1) Establish a Master Plan
- 2) Make the Bidding Guide

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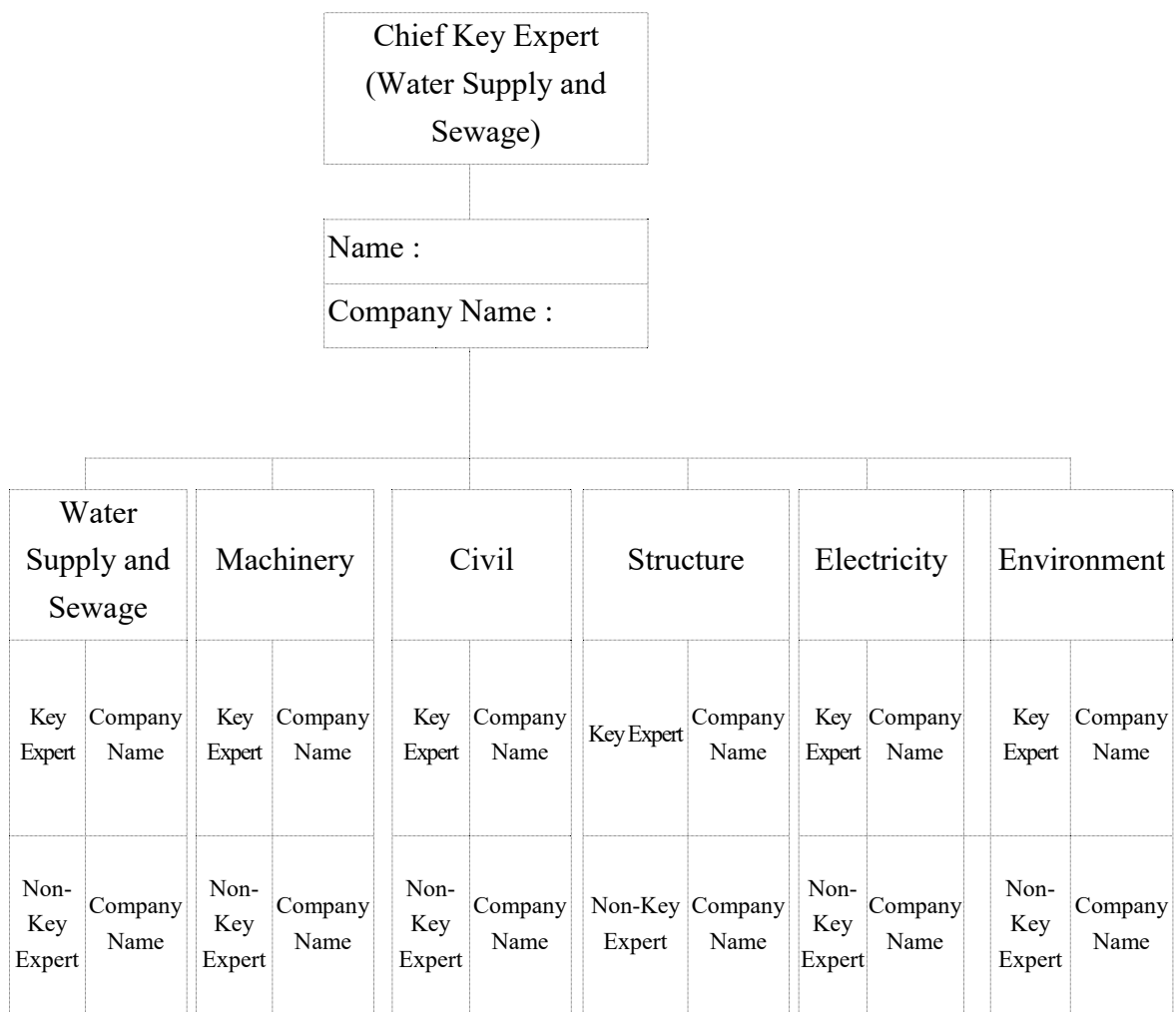
### 3) Other requirements

6. **Duration of the Services** : twelve(12) months from the contract commencement date

### 7. Uniqueness

- This consultancy may be changed, deleted, or added due to changes in the project Conditions.
- However, due to the boundary change of KMIC project site currently, the land use plan and detailed design will be slightly changed. Despite these changes, there will be no change in the amount of service.

### 8. Organization



\* If possible, write the Co-work Plan with local companies

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## **II. GENERAL TERMS AND CONDITIONS**

### **1. Scope of Application**

- 1.1 This document describes the requirements for a establishing master plan and a bidding guide for KMIC wastewater treatment plant.
- 1.2 All the work shall be carried out in compliance with this document, if any items not to be defined in this document, the Consultant shall consult them with the Client after reviewing them in accordance with Myanmar's codes and standards, Korea design standards, international construction standards, regulations which may be applicable to the services.

### **2. Definition**

- 2.1 "Client" means KMIC Development Co., Ltd. (KMIC) that signs the Contract for the Services with the selected Consultant.
- 2.2 "Consultant" means a legally-established professional consulting firm or an entity that may provide or provides the Services to the Client under the Contract.
- 2.3 "Supervisor" means an employee appointed and notified by the client who is able to direct and supervise the Consultant to facilitate the performance of the task.
- 2.4 "Design Document" means Master plan report, Bidding guide, cost estimation book, especially various drawings and other related documents requested by KMIC, as necessary.
- 2.5 "Design Drawings" means drawings to be produced by the Consultant in order to express shape and size of the final product. These shall be a basis of quantity calculation and cost estimation.
- 2.6 "Document for Design Criteria" means document which describes applicable criteria and codes, etc. when conducting design for the Services. The Consultant shall determine applicable criteria through consulting with the Client after comprehensive review and study of international standards.

### **3. Priority for Interpretation of the Terminology**

- 3.1 Interpretation of terms in this TOR shall be interpreted in the following order.
  - 3.1.1 Contract documents (including TOR)
  - 3.1.2 Myanmar's relevant law of wastewater treatment
  - 3.1.3 Korean and other construction relevant law of wastewater treatment
- 3.2 If the Client and Consultant have different opinions upon the interpretation of this work scope, the English version has priority. In the case of inconsistency, the interpretation thereon shall be amicably made through mutual consultations.

### **4. The Client's Right**

- 4.1 In order to be conducted the Services smoothly, the Client shall have the right to monitor and supervise the following contract related work scope to the Consultant from time to time, and the Consultant shall follow the Client's instruction.
  - 4.1.1 Manpower status
  - 4.1.2 Progress and deliverable of Services
  - 4.1.3 Other requirements
- 4.2 The Supervisor may conduct inspection regularly or occasionally to the Consultant for design quality, and the Consultant shall follow the Client's instruction, unless there is a specific reason.

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## 5. Responsibility of the Consultant

### 5.1 Limitation of Responsibility

- 5.1.1 The Consultant shall assume full responsibility for the adequacy of all the deliverables irrespective of any approval or consent by the Client. Any defects such as errors, faults and mistakes caused by the Consultant shall not be exempted from the Consultant's responsibility despite of completion of the Services, and if the Client requests to correct/rectify the defects, the Consultant shall immediately correct/rectify them at its own cost.
- 5.1.2 The Consultant shall be liable for and shall indemnify the third party against all losses, damages, charges, whatsoever which may arise in connection with the Services.
- 5.1.3 Just written report, notice, request and claim being submitted by the chief key expert's responsible engineer shall be contractually binding.
- 5.1.4 If the Client requests the Consultant to submit materials relating to the Services, the Consultant shall comply with the Client's requests and explain them despite of completion or in the suspension for Services.

### 5.2 Implementation of Work Instruction

In the event the Supervisor instructs the work order in writing, the chief key expert shall submit the implementation plan and result report with signature.

### 5.3. Consulting with Relevant Entity

- 5.3.1. The Consultant shall directly negotiate with the relevant entity in case the Client requests for obtaining approval from the relevant entity.
- 5.3.2 If the Client requests the Consultant to submit some materials and attending for the meeting for consulting with the relevant entity, the consultant shall follow the Client's requests.
- 5.3.3 The Consultant shall obtain the Client's approval on consulting contents and materials, etc. before consulting with the relevant entity.
- 5.3.4 The Consultant shall immediately report negotiation result to the Client after completion of the negotiation with the relevant entity and shall submit summarized materials such as minutes of the meeting, etc. upon completion of the Services.

### 5.4. Progress Management

- 5.4.1 When the Client requests materials and data related to obtaining the project approval in each approval phase, the Consultant shall submit the relevant expected schedule to avoid missing approval schedule.
- 5.4.2 The Consultant shall check and manage continuously on the Services progress and workload, and submit the monthly progress report to the Client including remaining workload, its required number of days and provisional bidding commencement date for construction bidding, etc.
- 5.4.3 The Consultant shall consult with the Client on works related to the Services progress such as making a work schedule, all sort of meeting schedule and submission materials, etc before the commencement of such works.

### 5.5 Keeping Record in Writing

The Consultant shall document and keep records of all major matters, aspects or issues such as discussed or negotiated matters and materials with related entities and all instructions by the Client and sets of actions and measures taken by the Consultant with



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regard to the instructions. When the Client requests for the submission of such documents, the Consultant shall submit them.

#### **5.6 Restudy**

If the Client requests restudy due to defects of the outcome or inappropriate work process in relation to performing the Services, the Consultant shall comply with this instruction at his own cost.

#### **5.7 Obligation for Safety Management**

When conducting the Services, the Consultant shall comply with safety requirements in relevant law and regulations. The Consultant shall be liable for the accident, damages and loss whatsoever which may arise during conducting work in connection with the Services due to negligence or inattention by the Consultant.

#### **5.8 Observance of Law and Regulations**

In the event of any violation of the law caused by the Client conducting the services, the Consultant shall be liable for damage.

### **6. Prior Approval for Principal Work**

The Consultant shall submit the consultation documents and get approval from the Client before implementing the followings.

- 1) Change of Design Plan and Commencement Report
- 2) Making or change of Document for Design Criteria
- 3) Principal change of Master plan and design drawing
- 4) Issues that require advice from experts, and negotiation matters with relevant entities
- 5) Others to the Client's requirements
- 6) Others to the Consultant requirements

### **7. Arrangement and Replacement of Engaged Consultant's Engineers**

- 7.1 The Consultant shall be placed in accordance with the submitted proposal document. However, if it is necessary to change due to unavoidable reasons, it must be approved by the Client.
- 7.2 In case the key experts or construction engineers participating in the service are unsatisfactory in the performance of the task or lacks of the technical capability, the Client shall request the replacement of the engineers to the Consultant. If there is no specific reason, the Consultant shall comply with the request.
- 7.3 In case an engineer participating is unable to perform the Service due to the retirement or other reasons, it shall be replaced with a competent engineer with equal or higher ability after getting approval from the Client.

### **8. Material Submission**

- 8.1 The Consultant shall sign or seal each submission after confirming whether it is consistent with the contract documents.
- 8.2 The Client may request for additional copies of materials or deliverables, contents modification and change of submission data not in this Service, in this case the Consultant shall comply with this requests.
- 8.3 The Consultants should rewrite and submit all submissions without delay in the event of a cause accompanying a major change in its contents.

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- 8.4 The Consultant shall report negotiation result to the Client after completion of the negotiation with the Client and the relevant entity, and shall submit summarized materials such as minutes of meeting, etc.
- 8.5 If the submitted documents by the consultant violate the contract, the consultant cannot avoid responsibility based on the materials reviewed and approved by the supervisor.

## **9. Submission of Commencement Report**

The Consultant shall submit the following documents immediately after commencing the task.

- 9.1 Notice to commence the Service
- 9.2 Notice of the chief key expert
- 9.3 Chief key expert's seal
- 9.4 Resumes and license's copy of the chief key expert
- 9.5 Resume and license's copies of key experts in each field
- 9.6 Documents that can be verified the technical qualifications and employment of all engineers engaged in the Service
- 9.7 Work schedule
- 9.8 Mobilization plan of manpower and equipment
- 9.9 Others to the Client's requirements

## **10. Report on task performance**

### **10.1 Kick-Off Meeting (Report on work plan)**

The Consultant shall hold a kick-off meeting within 15 days after commencement of the work.

### **10.2 Monthly Report**

The consultant shall report on a regular basis (7th of every month) including the following after confirming with key experts in each field.

- 10.2.1 Details of task performance during implementation of Service
- 10.2.2 Results of investigation and consultation with relevant entity
- 10.2.3 Major issue and solutions
- 10.2.4 Current status of Responsible engineers
- 10.2.5 Next month Work plan

### **10.3. Interim Report**

The Client may requests the Consultant to submit the relevant data if necessary. The data should be explained by Key expert for each field in charge.

### **10.4 Preliminary Inspection and Final Report before the Completion of the Services**

- 10.4.1 The Consultant shall apply for preliminary completion inspection two (2) months before the completion of the service, and shall take measures for the items indicated by the Client until the completion of the service. The Consultant shall submit the followings in the preliminary inspection

- 1) One (1) set of Master Plan Report
- 2) Bidding Guide(draft)
- 3) Construction cost analysis
- d) Matters to be submitted for each field of task description that the Client require

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10.4.2 The Consultant shall hold the conference for the final report approximately one (1) month before the completion of the Services and the Chief key expert shall report it. The date of conference shall be discussed with the Client.

10.5 Submit the Consultant's opinion during the construction  
When the Client requests opinion on design changes during construction implementation, the Consultant shall submit a written opinion.

## **11. Real-name Design System**

The Consultant shall comply with the following so that the Real-name Design System can be implemented in performing the Service

- a) Record management of this service's participant
- b) Make the expected design changes and supplement to requirements from relevant entities
- c) Chief Key Expert and Key Expert in each field shall sign and submit the design books and reports in the field of charge.

## **12. Coordination and Adjustment**

- 12.1 Key experts should hold meetings from time to time to coordinate their opinions, and in particular, Environment impact assessments and soil survey results should be in harmony reflected and promoted in the task.
- 12.2 The consultant should decide important matters in consultation with the supervisor. The minutes of the meeting should be prepared for these matters and submitted to the supervisor after getting the signatures of the participants.
- 12.3 The Wastewater treatment plant is a complex process, and when the process is about 70%, a meeting of Key experts for each field should be held an interim review meeting such as coordination and adjustment
- 12.4 The Consultant shall take action after receiving the opinions of the relevant departments/entity on the bidding guide and the construction cost statement, and it will be reflected in consultation with the supervisor.

## **13. Suspension of the Services**

- 13.1 The Client may order the Consultant to suspend the Services on condition that the implementation of the Services is impossible due to unexpected occurrence which is not caused by the consultant such as a delay in approval process, a delay in discussion with relevant authorities, and so on.
- 13.2 In case the Service is suspended for the reasons from the Client, not the Consultant's responsibilities reasons, additional task costs incurred during this period will be borne by the client.

## **14. Confidentiality**

- 14.1 The Consultant shall sincerely observe relevant laws with regard to confidentiality, and all the responsibilities for any violation against such laws shall be borne by the Consultant.
- 14.2 The Consultant shall submit the confidential related agreement forms signed by the Consultant and engaged engineers at the Consultant's commencement report. The duty contained in this Article shall be applied to the replacing engineers.

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- 14.3 When a participant is replaced, handover and takeover should be thorough, approval from the supervisor should be received, and there should be no setbacks in the performance of tasks.
  - 14.4 The Consultant should designate the workplace as a controlled or restricted area and restrict access of visitors.
  - 14.5 The data storage box should be kept separately, but it should be divided into confidential and general data storage boxes, and a person in charge should be designated and managed.
  - 14.6 In consideration of the progress of the process, when it is judged that a result that may cause a problem if leaked external has been made, Key experts shall record the contents of the work or daily report.
  - 14.7 Precautions : When Submitting Deliverable: The Consultant, if necessary, shall classify and maintain deliverables such as interim and final reports as confidential data by prior consultation with the Client based on the importance of content.
  - 14.8 Responsibility for Confidentiality Management: The consultant shall exert its utmost effort in security management, and shall assume full responsibility for all matters arising from failure in duty.
  - 14.9 The Consultant shall not give and copy any items concerning data and details, etc. of the Service to external entity and any personal without the Client's prior approval.
  - 14.10 Work wastes such as raw paper, scrap, and surplus generated in the workplace should be burned out or pulverized.
  - 14.11 Implementation of other security matter in the task performance process shall be carried out in accordance with the supervisor's instruction.

## **15. Additional Work or Change of Services**

- 15.1 In the event of occurrence of the following reasons for additional work or change of services during the implementation of the Service, the Client may request to the Consultant to add additional work or to change of the Service and the Consultant shall follow the Client's request.
  - 1) Change of the work scope resulting from the change of higher plan or the Client's plan
  - 2) Change of the work scope resulting from the application of the opinions from the relevant authority for project approval.
  - 3) Extension of the service period resulting from suspension of the Service which is caused by the Client
- 15.2 The cost incurred by additional work or change of the work scope shall be settled by mutual consent between the Client and the Consultant. In this regard, KMIC standards are followed.

## **16. Submission of Deliverables**

- 16.1 The Consultant shall prepare and submit the required number of copies in accordance with the standards for deliverables in each field.
- 16.2 The Consultant shall prepare and submit the requirements to take into consideration at each stage.
- 16.3 The Consultant shall deliver the necessary documents for construction order by the date specified by the stage if the project is to be implemented in stages due to the client's requirement.
- 16.4 The Consultant shall take pre-inspection of the deliverables fourteen (14) days before the planned delivery date or service completion date and shall revise the supplemented deliverables when submitting the final deliverables.

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16.5 All deliverables shall be submitted in a computerized file. For distribution: CD-ROM, for storage: external hard disk

## 17. Precautions for creating deliverables

17.1 The deliverables shall be written in English, but also be written in Korean, if necessary, in consultation with the Client, depending on the nature of the deliverables.

17.2 Regulations, statistics and materials cited or referenced in the deliverables should be up to date. The terms used in the contents of the performance must be standard or technical terms.

17.3 The content of the sentence should be simple and clear, easy to understand and avoid repeating conventional expressions or stereotyped phrases so as not to cause confusion.

17.4 Statistical data should be based on well-founded and objectively recognized materials, and the source should be clear when using the following data.

- 1) Statistics of Government Agencies
- 2) Statistical data of local governments under the jurisdiction of the project
- 3) Other public institution statistics
- 4) Field survey results, etc.

### 17.5 How to create a CD-ROM

#### 17.5.1 Information of CD-ROM

The Consultant shall save the information of deliverables file in the CD-ROM as follow in Tabel-1 below.

<Table-1>

Service Name			
Project Name			
Name of Consultant		Representative	
Duration		Delivery date	
Tel.		Name of Client	

#### 17.5.2 List of Services participants

The Consultant shall store the design participant list in the CD-ROM as shown in Table-2 below to clarify the responsibility for writing the design book.

<Table-2>

Field	Name	Birth	Participation period	Company

## 18. Others

18.1. KMIC will provide Soil and ground investigation & survey data.

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### **III. SCOPE OF THE ASSIGNMENT, TASKS, AND EXPECTED DELIVERABLES**

#### **1. Scope of Application**

This statement of work applies to the consulting service assignment in “KMIC Master Plan and Bidding Guide for Wastewater Treatment Plant”. All submission of performance products shall be carried out and submitted in each case.

#### **2. Main Task Contents**

- 2.1 Project Overview
- 2.2 Present-condition survey and analysis
- 2.3 Review relevant laws of Wastewater treatment plant
- 2.4 Analysis of installation location and location conditions
- 2.5 Set the discharge area and target year
- 2.6 Planned waste quantity and expansion plan(step-by-step)
- 2.7 Establishment of inflow and emission water quality
- 2.8 Review the wastewater treatment method
- 2.9 Land use plan (with Circulation plan)
- 2.10 Calculation of required site area
- 2.11 How to use treated water
- 2.12 Suggestion on various function of facilities
- 2.13 Design Criteria and Reference materials
- 2.14 Master Plan for Wastewater treatment plant
- 2.15 Rough Construction cost estimation
- 2.16 Operation and Maintenance Plan (including Tariff)
- 2.17 Consultation with related organizations or Approval
- 2.18 Creating Design Document
- 2.19 Deliverables

#### **3. General Instruction**

- 3.1 Participants in this task should be experts with knowledge and experience in wastewater treatment plant, and should ensure that reasonable and efficient tasks are conducted.
- 3.2 This task should be comprehensively reviewed in relation to the overall KMIC plan, relevant laws, the results of the impact assessment and consultant with the relevant entity, etc.
- 3.3 Planning and facility standards related to this task should take precedence over Myanmar related laws, but be planned in accordance with other related laws and standards in consultation with the supervisor. If it is inevitable to change the existing plan in order to perform the task, the reason for the change should be presented and requested.
- 3.4 Prior to this plan, through detailed present-condition investigation and analysis, the potential of the district should be derived, reflected in the plan, and harmonized with near rivers and land use of neighboring lands.
- 3.5 The Consultant decides to apply future indicators to this project in the following order.
  - 3.5.1 Myanmar Environment Government’s official data
  - 3.5.2 Provisional Resources of Myanmar Government
  - 3.5.3 Public data of the relevant specialized agency
  - 3.5.4 In case no data are available, consult with the Client
- 3.6 When performing other tasks, comments of relevant entity should be reviewed and reflected in the master plan.
- 3.7 After surveying and analyzing the current status of Korean and foreign wastewater and sewage treatment plants, it is necessary to fully review the treatment method etc.
- 3.8 Deliverables

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3.8.1. The deliverables and reports should be discussed with the supervisor in advance about the contents and editing method. After the draft should be printed after being inspected by the supervisor.

3.8.2. All data used to perform the task shall be organized into CD-ROM and submitted to Client.

#### **4. Detailed instructions**

This task should be carried out in parallel with the Detailed Plan and Design, Impact Assessment for KMIC and so on. Therefore, comprehensive review of related tasks should reflect technically necessary items for planning.

##### **4.1 Present-condition survey and analysis**

Present-condition survey and analysis is the process of research on natural environment, humanities environment, industrial and economic sectors, and review of existing top plans. The results of the previous survey and analysis are the most basic part of planning, and should be used as most recent indicators for planning.

4.1.1 Natural Environment : Prediction and analysis of topography, land use status, meteorological status, river status, discharging water status and changes in the natural environment after future development

4.1.2 Humanities Environment : Analysis of administrative districts and population, economy and industry status, etc.

##### **4.2 Set the discharge area and target year**

After reviewing the wastewater treatment area, setting target year, and related upper level plans, the target year is set through a detailed on-site investigation, and an appropriate treatment area is determined in consideration of the topographical conditions within the complex and sewage pipelines.

##### **4.3 Planned waste quantity and expansion plan(step-by-step)**

The planned amount of wastewater is based on the amount of domestic sewage and groundwater flow, and if there is a source through on-site investigation, it should be calculated including the amount of factory wastewater and leachate. The economic feasibility of step-by-step expansion plans should be reviewed in consideration of plant move into KMIC Project site. In addition, the adequacy of basic units such as groundwater inflow and domestic wastewater is verified and applied.

4.3.1 KMIC project is divided into two phases, and the total facility capacity is 5,100 m<sup>3</sup>/day, but an expansion plan can be established by subdividing it in consideration of the time when the first tenant operates the factory.

4.3.2 In consideration of the expansion plan, establish a plan so that facilities for each type of work can be installed continuously.

##### **4.4 Establishment of inflow/emission water quality and target year**

The design unit of inflow/emission water quality is calculated by surveying the wastewater treatment of similar industrial wastewater treatment plants operating in Myanmar and Korea. After that, the optical inflow and emission water quality standards should be established.

##### **4.5 Review the wastewater treatment method**

4.5.1 Economical and efficient treatment methods according to the contents of wastewater

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should be reviewed. The treatment rate should be determined in consideration of the inflow water quality of the wastewater treatment plant, the discharge water quality required by the upper level plan. And new construction methods of Myanmar and other countries should be compared and reviewed to suggest optimal plan to KMIC.

- 4.5.2 An optimal plan should be suggested after reviewing a sewage treatment plan that can efficiently cope with changes in the contents of sewage generated by the direct flow of food waste into the sewage treatment plant due to the use of the disposer.
- 4.5.3 The sludge treatment status and sludge water content should be analyzed for each treatment method, and an optimal treatment plan reflecting upper level plans such as environmental laws and related organizations should be suggested.
- 4.5.4 For each method, the best reasonable and economical alternative is selected in consideration of the living zone plan, street network economy, and construction cost, but the final alternative is decided in consultation with the supervisor.

#### **4.6 Land use plan (with Circulation plan)**

Establish a plan to minimize construction and operation costs by establishing an efficient land use plan for the construction and operation of wastewater treatment plant.

#### **4.7 Calculation of required site area**

It is necessary to survey the required site area and layout plan for a nearby wastewater treatment plant, and to calculate the initial site area of a wastewater treatment plant in consideration of strengthening the standards related to wastewater treatment in the future. If an additional site area is required due to the strengthening of the discharge water standard, the optimal required site area should be calculated by securing extra area.

#### **4.8 How to use treated water**

Specific reuse plan for recycling wastewater treated water should be reviewed. When planning the reuse of treated water, sufficient consideration should be given to the supply and demand of water and the target of the use of treated water, and after collecting and reviewing the various water quality standards. If the treated water is discharged to the outside, the appropriate water quality and necessary equipment are suggested.

#### **4.9 Method of various function of facilities**

- 4.9.1 Based on the purpose of upper level plan and current status, suggest appropriate methods/functions in terms of efficient facility operation and management or securing publicity.
- 4.9.2 After consulting with the supervisor, review and suggest the resource circulation plan applied to KMIC

#### **4.10 Design Criteria and Reference materials**

- 4.10.1 The Client apply the Criteria related to wastewater treatment plant laws of Myanmar, but if it is difficult to apply, the plan should be based on the related guidelines such as the surrounding treatment status and Korea/International laws.
- 4.10.2 Data published by public institutions should be used, but reasons should be specified when using other data.
- 4.10.3 The design standards for each facility according to the sewage and sludge treatment process should be reviewed with reference to various Korean and other countries' design standards, wastewater treatment plant data, etc.

#### **4.11 Master plan for Wastewater treatment plant**

- 4.11.1 Master plan for unit process and operation of each facility are established so that technical, rational and economical treatment facilities can be installed with respect to civil engineering, architecture, electrical and mechanical functions of the wastewater



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treatment plant. It should be properly reviewed so that the best equipment can be selected in consideration.

4.11.2 Survey the current status of deodorization technology and suggest a deodorization plan suitable for the treatment facility and surrounding conditions.

4.11.3 Basic design drawing for the bidding of civil engineering, architecture, mechanical, electrical, and landscaping construction should be made.

4.11.4

a. Civil engineering plan

Facility arrangement, site plan height (digging, backfilling, residual soil treatment etc.), hydraulic calculation, structure plan, soil quantity and foundation, storm water distribution plan, discharge plan etc.

b. Architecture plan

Building arrangement and floor plan, integrated building plan etc.

c. Machinery plan

Debris removal method, inflow pump, water treatment method, sludge treatment etc. Mechanical and piping facility plan, ventilation facility plan, odor treatment method, disinfection facility etc.

d. Electricity plan

Power supply, emergency power plan, monitoring and control method plan etc.

e. Landscape plan

Green space, facility installation and planting plan etc.

#### **4.12 Rough Construction cost estimation**

The rough construction cost estimation of the wastewater treatment plant should be calculated for each field and facility, and an annual financial plan should be established accordingly.

#### **4.13 Operation and Maintenance Plan (including Tariff)**

The management organization, integrated maintenance plan, operation manpower calculation and operation method, and equipment and facilities required for efficient operation should be established. The annual maintenance cost of the wastewater treatment plant should be calculated in consideration of electricity, water, chemical, repair, labor costs, etc.

#### **4.14 Comparative review of Wastewater Treatment Plant installation and Operation methods**

Survey wastewater treatment plant such as Thilawa SEZ in Myanmar, Korea, and other country, compare and review various installations and operation methods(ex. PPP, turn-key and BOT), and propose a reasonable method applicable to KMIC after consultation with the Client.

#### **4.15 Approval**

The necessary approval documents for wastewater treatment laws or relevant standards in Myanmar should be prepared and submitted.

#### **4.16 Design Documents**

4.16.1 Master plan report

a. The report should be written based on the current status, survey of the upper plan, and the results of the overall performance of the master plan.

- b. Various survey data and consultation data of relevant organization should be included in the report.
  - c. When citing contents, the source of the data shall be indicated in the report.
  - d. The report should be classified into English/Korean summary and a detailed report.
- 4.16.2 Design drawing
  - a. Design drawing shall be prepared by sufficiently including the contents of the master plan.
  - b. At the front of the drawing documents, a table of contents of the entire drawing should be written.
- 4.16.3 Rough construction cost statement
 

The Rough construction cost statement shall be prepared for each field of construction and the basis for calculation shall be described.
- 4.16.4 Bidding guide
 

The contents of the bidding guide may be adjusted according to the decision related to the installation and operation of the wastewater treatment plant of the Client, and basically the following contents are included.

  - a. General instruction for bidding
    - a) Precautions for bidding
    - b) List of submitted documents
  - b. Construction description
    - a) Summary of Wastewater treatment construction
    - b) Each field overview of construction
  - c. Description of bidding for construction
    - a) General description
    - b) Specific description
  - d. Condition of Contract
    - a) General condition of Contract for construction
    - b) Specific condition of Contract for construction
    - c) Advanced Payment standard
  - e. Design and construction guidelines
    - a) Common requirement
    - b) Design guidelines
    - c) Construction guidelines
    - d) Other requirement
  - f. Making design documents guidelines
    - a) General provisions
    - b) Criteria for submission of preliminary design documents
    - c) Criteria for submission of detailed design documents in priority construction
    - d) Criteria for submission of detailed design documents
  - g. Operation guidelines
    - a) Project execution
    - b) Input personnel information
    - c) Quality control
    - d) Process Management
    - e) Safety Management
    - f) Environment Management
  - h. Evaluation criteria and Forms of bidding
    - a) Eligibility for participation in bidding
    - b) Form of bidding
    - c) Detailed standards for decision of successful bidder
    - d) Evaluation Standards
  - i. Annex

- a) Soil and ground investigation data
- b) Relevant design drawing
- c) Expected variations/ Design Changes List
- d) Expected design changes , comments and results of relevant department

#### 4.17. Deliverables

The deliverables can be adjusted in consultation with supervisor and settled accordingly.

Name	Quantity	Size	Remark
Summarized Report (Master Plan)	10 copies	A4	
Comprehensive Report (Master Plan)	50 copies	A4	
Design drawing	10 copies	A3	Including downsized
Construction Cost Estimation & Standard	50 copies	A4	Including unit cost calculation data
Design book for construction tender	50 copies	A3	
Bidding Guidelines	50 copies	A4	
Various approval materials	1 set	A4	
CD - ROM	3 set		Original recording of data
Other data to the Client's requirement	1 set	A4	Present status survey data, related organizations Consultation materials, photo book, etc.

※ All deliverables must be written in English, but in Korean as required.